NOTES.

AT the meeting of the Convocation of the University of London on Tuesday, the University was saved from committing an act detrimental to its best interests. The report of the annual committee condemning the recommendations of the Gresham Commissioners as to the reconstruction of the University was under consideration. It was urged by the supporters of the report that the rapidly increasing number of candidates who present themselves for the University examinations, was a sufficient argument against any change of constitution. We agree with Dr. Hart, that the University has raised the standard of education, that it has encouraged the aspirations of persons unable to bear the expense of residence in University towns, and that it has done much for the higher education of women. But the time has arrived when the University must become more than a mere examining body, if it wishes to keep pace with the times. Members of Convocation who are jealous of the prerogative position at present occupied should look around, and then ask themselves whether London ought not to have a teaching University like those of other capitals in Europe. A mistaken idea as to the dignity of the University should not be allowed to stand in the way of the proposed developments. It would be far more dignified to accept the changes, unless, indeed, the University of London desires to find itself eclipsed by another with a charter more suited to the requirements of to-day. Some of the most eminent members of Convocation recognise the necessity of the old order giving place to the new. Prof. Sylvanus Thompson pointed out that when functions were, as in the case of London University, extremely limited, they should be extended. "Why should not," he said, "the University perform all those great duties of encouraging research and learning and of teaching, which were an essential part of a true University. He hoped the matter would be approached in a temperate spirit, and that they would not stand on a mistaken notion of their dignity. There might be blots on the scheme which they should seek to remove, but was it wise to oppose the scheme in a thoroughly hostile spirit? Let them beware of showing such a spirit, for it might be that a new University would arise, discharging all the functions of a University, and the present University of London might be left in the cold. The substitution of a new charter for an old did not, as they knew from past experience, impair the continuity of their existence. It would be a great pity if two Universities should arise—one not called by the name of the capital, but doing all the work of a University, whilst that which was called the University of London was restricted to the narrow sphere of examinations." Mr. Thiselton Dyer also supported the recommendations of the Royal Commissioners, rightly remarking that the scheme would enable the University to develop its full powers, especially in the department of post-graduate study, in which lies the true glory of a University. The resolution of the annual committee, protesting against the withdrawal of the present charter, was eventually set aside by an almost unanimous vote. This is satisfactory as far as it goes, but it does not dispose of the matter in a very effective manner. A motion was afterwards proposed by Sir Albert Rollit, in the following form:—"That, with a view to the speedy and satisfactory reconstitution of the University, it is desirable to secure, if possible, the co-operation of the Senate and Convocation, and with this object Convocation refers the whole question of the reconstitution of the University to the annual committee, with power to nominate members of a joint consultative committee of the Senate and Convocation." This was unanimously adopted; so the University is once more given the chance of reconsidering its policy, and of gracefully accepting the proposed changes before they are forced upon it.

IN August, 1892, the Board of Trade sent to the Directors of each of the railway companies of the United Kingdom a copy of the report of the Royal Society's committee on colour vision (NATURE, vol. xlvi. p. 33), asking for observations upon the recommendations it contains. It was pointed out that, as regards the officers employed in the mercantile marine, the Board of Trade had taken steps to give effect to the recommendations of the committee on the method of testing, and the Directors were urged to give careful consideration to the matter as far as concerned persons employed on their railways. A Parliamentary paper just published contains the replies received from the railway companies. On the whole, the result is satisfactory. Many of the companies accept Holmgren's wool test for colour vision, and Snellen's type system of testing form, though a large number use modifications of them, or supplement them with other tests. The necessity of periodical examinations is generally recognised, but the interval between the examinations varies in different companies from six months to five years. The directors of the Metropolitan District Railway consider that the committee's recommendation that the colours used for lights on board ship, and for lamp signals on railways, should, as far as possible, be uniform in tint, as quite inadmissible. They say that the shades of light adopted for their signals are the result of long and careful experiments, and of trials of many shades and gradations, and are best adapted to the peculiar circumstances of underground working. It is also remarked that the cases of sighting at sea and sighting upon a railway, subject to such atmospheric variations as occur on the underground systems, are totally different. This strikes us, however, as sheer nonsense.

THE French National Society of Horticulture will hold its tenth congress next month, and at the same time the annual horticultural exhibition will take place. The congress will be of an international character, and a number of interesting questions are down for discussion. Among these subjects are: Chlorophyll considered in relation to the vigour of cultivated plants; capillarity in relation to the preparation of the soil; the means of accelerating the nitrification of substances containing nitrogen, and therefore to render them more easily assimilable; the necessity of a unit of comparison for use in connection with the various systems of heating with hot water. Further information concerning the congress can be obtained by application to the Society, 84, Rue de Grenelle, Paris.

AN International Exhibition of Horticulture and Fruit Culture will be opened in St. Petersburg on September 22, and will remain open until November 12.

THE death is announced, at Saratoff, of M. Paul Jablochkoff, the inventor of the Jablochkoff candle system of electric lighting.

THE Right Hon. Lord Bowen, a friend of science and a supporter of her interests, died on Tuesday at the age of fifty-nine. He was elected a Fellow of the Royal Society in 1885.

AN astronomical congress will be held in San Francisco in June next, in connection with the Californian Midwinter International Exhibition.

MR. A. D. HALL has been appointed Principal of the Agricultural College at Wye, established by the joint county councils of Kent and Surrey.

A WRITER in the current number of the *Chemical News* enumerates some of the streets, avenues, and public squares in Paris, named after eminent men on account of their scientific labours. In some instances the streets thus designated are appropriately placed near learned institutions with which the investigators' names were associated; in others, the names of men engaged in the same branch of science are grouped within small areas. It is pointed out that the "Jardin des Plantes is bounded by streets named respectively Cuvier, Buffon, and Geoffroy St. Hilaire; while in the immediate vicinity are the streets Lacépède and the Place Jussieu. Elsewhere in Paris the following names occur:—Lamarck, Linnæus, de Saussure, and Humboldt. Near the École de Médecine runs the street Dupuytren, and in the same quarter the eminent physician Velpeau is honoured. Near the Hospital La Salpêtrière two English physicians lend their names to streets, Harvey and Jenner. In the neighbourhood of the Arc de Triomphe occur the names of the astronomers Copernicus, Galileo, Kepler, Euler, and Newton; elsewhere we find the streets Huyghens, Laplace, and Herschell. Mathematicians and physicists have not been forgotten, as shown by the occurrence of the following street names:—Biot, Pascal, Lalande, Lahire, D'Alembert, Dulong, Arago, Monge, Legendre, Ampère, Fresnel, Becquerel, Galvani, Volta, Franklin, and Faraday. Ampère, Galvani, and Faraday are near each other. Philosophy is represented by Descartes, Auguste Comte, and Bacon; engineering by Vauban, Watt, Stephenson, and Fulton; useful inventions by Bernard Palissy and Guttenberg; exploration by Christopher Columbus and Magellan. Chemists have received, however, a larger share of the honours than any other single class, not even excepting men of letters. Thus we find streets named after the French chemists Bayen, Berthollet, Cadit, Chaptal, Darcet, Daguerre, Gay-Lussac, Lavoisier, Langier, Orfila, Parmentier, Payen, Raspail, Rêaumur, Rouelle, Thénard, and Vauquelin; the Swede Berzelius; and the Englishmen Davy, Faraday, Priestley, Cavendish, and Watt." A straw is sufficient to tell which way the wind blows, and the above simple facts serve to show that the municipal authorities of Paris consider the names of men of science just as worthy of being handed down to posterity as those of followers of other professions. Similar authorities on this side of the Channel have not yet reached the condition in which scientific workers are thus recognised.

THE Paris Geographical Society has made the following awards for geographical research:—A gold medal to M. Casimir Maistre for his exploration between the Congo and Niger; a gold medal to Prince Henry of Orleans for his scientific journey to Tonkin and in the Laos country; Prix Pierre-Felix Fournier to M. Vital Cuinet for his important work on "Turkey in Asia"; a gold medal to M. André Delebecque for his researches on French lakes; a gold medal to M. E. Foa for his explorations in South Africa, from the Cape to Lake Nyasa; Prix Herbet-Fournet to M. P. Savorgnan de Brazza for his explorations in the French Congo, and for the part he has played in the colonial expansion of France; a gold medal to M. M. Monnier for the whole of his explorations, and especially for his voyage to the Ivory Coast; a gold medal to M. H. Schirmer for his monograph on the Sahara; a silver medal to Dr. A. Hagen for his scientific studies on the New Hebrides; a silver medal to M. L. Vignon for his works on French colonies, and especially for his important work "La France en Algérie"; Prix Jomard to M. Camille Imbault-Huart for his work on the "Island of Formosa."

THE exploration of the Lukuga river, which forms the periodic outlet of Lake Tanganyika, by the Katanga expedition under M. Delcommune, forms the subject of a short article and map in a recent issue of the *Mouvement Géographique*. The river was traced down to its confluence with the Lualaba or Upper Congo, in the last months of 1892. After leaving the lake the river pierced the Kakazi hills in a gorge, lined by cliffs 300 metres high, then expands in a marshy tract, contracts to pass another gorge, and expands once more on the plain, where it enters the Lualaba 230 miles from its source in Lake Tanganyika, and at a level 300 metres lower. Though the volume of the river was small at the time of observation, and the water very shallow, evidence was found of the occasional occurrence of very heavy floods. It appeared that the Lukuga first became an outlet of the lake in consequence of an exceptional rise of the water-level forcing an exit through the most easily breached part of its coast-line.

THE Norwegian whaler *Jason*, Captain Larsen, has succeeded in reaching what is probably a higher southern latitude than any steam vessel had previously done. Part of the log of the vessel has been forwarded to Dr. John Murray, who communicated it to the April number of the *Scottish Geographical Magazine*, along with a map of the *Jason's* route. The discoveries made were, in Dr. Murray's opinion, the most important since Ross's voyage. The Dundee and Norwegian sealers in 1892 found the sea to the south of Joinville and Louis Philippe Lands blocked with ice and swarming with seals; but in November 1893, Captain Larsen found clear water, and saw few seals. On December 1, when in lat. 66° 4′ S. and long. 59° 49′ W., rocky land was seen to the east, the coast-tending from N.W. to S.E. High snow-covered land was seen to the south on December 4, in lat. 67° S. and long. 60° W., and two days later the ship reached her farthest south point, 68° 10′ S., finding a stretch of low bay ice with few cracks. A group of islands was found on the return, situated about 65° 7′ S. and 58° 22′ W., on two of which active volcanoes were observed. Captain Larsen landed on these islands, which were not covered with snow; but in order to do so, he had to cross seven miles of ice, using Norwegian snow-shoes for that purpose. Volcanic rocks were strewn on this ice, evidently thrown up by the volcanoes. The currents were observed to come from the south, and southerly winds were frequently met with, indicating the possibility of an Antarctic area of high atmospheric pressure. The map on which these discoveries are marked shows Grahamsland as a peninsula, and involves a slight alteration in the provisional sketch of the probable outline of the Antarctic continent. The result of this cruise adds great point to the agitation for an Antarctic expedition on a large scale, and it is interesting to note that the open sea so far south occurred simultaneously with an exceptional dispersal of Antarctic ice over the southern ocean.

BUT comparatively little is known of the bacterial contents of sea-water, and by far the greater part of the information which we have on this subject has been collected by Dr. H. L. Russell. The first observations made by this investigator were carried out at the Naples Zoological Station, and were subsequently published in the *Zeitschrift f. Hygiene*, vol. xi. 1891. Since then Dr. Russell has made an elaborate inquiry into the conditions affecting the distribution of bacteria, both in sea-water and mud, collected from the Atlantic Ocean near the coast of Massachusetts. A reprint in pamphlet form of these results, published from time to time in the *Botanical Gazette*, places very conveniently before the reader the various questions which have been attacked. Four new varieties of bacilli have been isolated, described, and carefully drawn, but to none of them was any pathogenic property attached. One of the most prevalent of the sea-mud forms that was isolated in the Mediterranean, was also found to be a common inhabitant of the sea-slime in this part of the Atlantic. One of the varieties isolated was found exclusively in the ground layers of the sea-bottom, whilst the three other forms were found both in the water and the underlying ground layers. Sunshine produced as disastrous results on these sea-water bacteria as on those obtained from fresh water. In his conclusions Dr. Russell points out that the indigenous marine flora of both water and sea-floor is restricted to relatively few species; a marked contrast to the bacterial contents of rivers, lakes, &c.

WE have received from the Berlin Aquarium Society a copy of the regulations and of several other documents relating to the Marine Zoological Station established in 1891 by that enterprising body at Rovigno, in the Adriatic. Primarily intended as a source of supply of living marine animals to the Berlin Aquarium, the Rovigno station is also equipped for the purposes of scientific research with all the ordinary apparatus and reagents of a biological laboratory, a Jung microtome, a circulation of pure sea-water, a steam-launch, and a growing library. The site of the laboratory seems to have been very carefully chosen with a view to the purity of the sea-water supply, several available and nearer sites having been rejected owing to the existence of an excess of fresh-water or some other source of contamination. The fauna is rich and varied, the climate mild and genial; and Rovigno, without pretending to be in the van of modern culture, seems to be a pleasant and hospitable town, not least among its attractions being an excellent light wine at sixpence per litre! No charge is made for working in the laboratory, and permission may generally be obtained upon application to the Berlin Aquarium. The Rovigno staff is always willing to supply information as to lodgings in the town, and can also put up four naturalists at a time in the laboratory house at the moderate charge of one shilling per day. Altogether, British naturalists in search of fresh seas and creatures new may well consider the generous claims of the Rovigno station.

THE Royal Meteorological Institute of the Netherlands has issued its forty-fourth *Jaarboek*, containing observations made thrice daily at a number of stations, and hourly at four places. A considerable improvement has recently been made in the Dutch meteorological service by the adoption of the international scheme of publication recommended by the meteorological congresses; but it has already been pointed out by Dr. Hellmann that a further improvement might be made by taking the evening observations at one hour, instead of 7h., 8h., or 10h. p.m. as at present. There are few countries that can boast of a longer continuous series of trustworthy observations.

THE Rev. S. Chevalier, Director of the Zi-ka-wei Observatory, near Shanghai, has published a detailed discussion of the typhoons of 1892, based on observations made in the months of July, August, and September, on ships and at land stations. The pamphlet contains synoptic charts and valuable data for the study of the behaviour of these storms, and also a chapter devoted to the examination of some important questions relating to them. It has been stated that an area of high pressure always precedes, by some days, the arrival of a typhoon, but out of five of the principal typhoons of the year 1892 the author finds that only one was preceded by an anticyclone. Another important question is that of the convergence of the winds towards the centre of the cyclone. The observations show that the winds do converge towards the centre, not only in the exterior zone of the typhoon but also in the whirl itself. With regard to determining the distance of the centre of the typhoon according to the fall of the barometer, the conclusion arrived at is that while the fall is more likely to give an idea of the distance of the centre than the absolute height, the figures show clearly that no exact measure of the distance can be obtained by that means. An empirical rule for determining the rate of progress of the centre, formulated by Captain Fournier, has been found useful in some cases. An explanation of this rule and examples of its application are given in the pamphlet in question.

THE determination of the pitches of very high notes appears to be greatly facilitated by an arrangement recently worked out by F. Melde, and described in the current number of *Wiedemann's Annalen*. The extreme difficulty of distinguishing between the various octaves of the same high note, led Mr. Melde to abandon the use of the ear altogether, and to apply the microscope to the more reliable vibrographic method. To prepare the plate for taking the traces, he melted a mixture of stearine and olive oil, and spread it out with the finger, thus obtaining a thin layer with a delicate ridged structure, which could be renewed by simply passing the finger over it. The tracing point chosen was a short piece of hair from the violin bow. By attaching one of these to each of the vibrating bodies, say a high tuning-fork and a rod vibrating longitudinally, and drawing the glass plate rapidly over the two tracing points, wave curves were obtained whose periods could be easily compared under the microscope. The tuning-forks were set vibrating preferably by means of a wet glass rod rubbing over a piece of cork attached to one of the prongs. This manner of exciting vibrations offers several advantages over that of the violin bow. The sounds produced are much more intense, they can be produced by either hand, or two at a time, and the rod is less perishable and less likely to get into the way of the other apparatus.

AN interesting paper on the difference of potential between an aqueous and alcoholic solution of the same salt, by A. Campetti, appears in the *Atti dell'Accademia di Torino*, vol. xxix. The author has determined the difference of potential which exists at the surface of separation between an alcoholic and aqueous solution of various salts, such as ammonium chloride, lithium chloride, calcium chloride, &c., which are soluble both in water and alcohol. The difference of potential was measured by means of dropping mercury electrodes, which have given satisfactory results in the hands of Pascheri. The measurements were undertaken with a view to seeing whether the numbers obtained by experiment agreed with the values obtained from Planck's formula, which gives the difference of potential in terms of the concentrations and ionic velocities of the electrolytes. The author finds that the formula is not applicable, but that in the case of two different solvents it is necessary to suppose there is some additional force coming into play, which is not taken account of in Planck's equation. He intends, in a subsequent paper, to give the results he has obtained on the ionic velocities in different solutions.

IN connection with the question as to the point of application of the mechanical force experienced by a conductor conveying a current in a magnetic field, M. Pellat has communicated a second paper to the Société Francaise de Physique, in which he comes to an opposite conclusion to that given in a former paper on this subject (see note in NATURE, March 22). The error in the former paper was due to the omission of a term in one of the equations. For if we consider a gramme ring at rest and on short circuit, and suppose that the field magnets are rotating, the wire of the armature is traversed by an induced current which warms it up, and it would be necessary to withdraw a quantity of heat Q to bring it back to its initial condition. If we consider the armature alone as a system, the electromagnetic forces, in this case, perform no work, and this heat communicated to the ring can only be due to energy supplied to the ring by the action of the electromagnetic forces, the product of an electromotive force by the quantity of electricity displaced being the equivalent of work, and this product may be called the work of the electromotive forces; it is work done on the system, and calling it e we have $e = JQ$. The same takes place when the ring is replaced by the Foucault disc. Consequently, in the case when the disc is in movement, the field magnets being fixed, it w is the work done by the weights which drive the disc, and x that done by the electromagnetic forces, we get

$e + x + w = JQ$. Hence, since $e = JQ$, $x = -w$. On the other hand, if we consider the disc and field magnets as forming the system under consideration, then $w = JQ$, and therefore $e = -w$. Since, therefore, the work done by the electromagnetic forces, in the case of the turning disc, is not zero, while the induced currents remain at rest with regard to the field magnets, the point of application of the electromagnetic forces must be the matter conveying the currents, and not the current itself, as the faulty reasoning in the previous paper indicated.

During 1893 a number of British agriculturists visited Canada, with a view to report upon the agricultural resources of the country. Among these visitors were Profs. James Long and Robert Wallace, and the reports prepared by these gentlemen have just been published. With the object of seeing exactly what is done by the Government for the benefit of the farmer, Prof. Long visited three of the five experimental farms which are now in full working order in the Dominion—those of Ottawa, Brandon, and Indian Head. The Ottawa farm is some five hundred acres in extent, and the reports of the experimental work done in it are sent to 25,000 farmers. The Manitoba experimental farm consists of 625 acres of land, in which a large number of valuable tests of grain suited to the country have been carried out. The experimental farm at Indian Head covers 680 acres. These farms are of the utmost importance to agriculturists. Hundreds of experiments are made in them with cereals, pulse, grasses, fruits, vegetables, forest trees, and plants of other kinds, with the object of providing the farmer with the best seed or the best variety. Some day, perhaps, our Government will promote the prosperity of agricultural interests in the British Islands, by establishing and endowing similar experimental stations here.

The members of the London Geological Field Class will visit Wanborough and Guildford on Saturday, April 21, under the direction of Prof. H. G. Seeley, F.R.S.

Messrs. Blackie and Son have issued a guide to the Science and Art Department examinations in heat, and one to the examinations in hygiene. Both books contain answers to questions set from 1886 to 1893, inclusive.

The "Handbook of Tasmania" for the year 1893, has been received. It contains a large amount of important statistical information referring to the colony, and a brief epitome of the historical portion of the "Tasmanian Official Record," which will in future be issued tri-annually instead of annually.

The April volume of *The Country Month by Month* (Bliss, Sands, and Foster) should be obtained by all ramblers through "meadows pied" and over "hillsides breaking in blossom," during this month. The book is brightly written by Mrs. J. A. Owen and Prof. G. S. Boulger, and forms a most interesting companion for country walks.

The scientific publications of the Government of South Australia are very much in arrears. We have only just received the volume of meteorological observations made at the Adelaide Observatory and other places in South Australia and the northern territory, during the years 1886-7, under the direction of Sir Charles Todd, C.M.G., F.R.S.

The Camera Club Conference will be opened by Captain Abney, at the Society of Arts, on Monday, April 23. Among the papers down for reading on the following day is one by Prof. W. Roberts-Austen "On the Methods of Recording High Temperatures by the Aid of Photography." Mr. A. Mallock will treat of "The Amount of Photographic Action Produced by Various Lengths of Exposure and Intensities of Light," and Mr. Andrew Pringle on "The Keeping Qualities of the Modern Dry Plate."

The *Journal* of the Royal Statistical Society for March contains an important and comprehensive paper (the Howard Medal Prize Essay) on "The Perils and Protection of Infant Life," by Dr. Hugh R. Jones. The author concludes by saying: "I have insisted that the preventable forms of child neglect are in the main referable to want of parental responsibility—a condition which, it is certain, largely depends on ignorance. The remedy—the only remedy—in which I have any faith or confidence, is education."

The report of Mr. C. Meldrum, the Director of the Royal Alfred Observatory, for the year 1892 has recently been issued. Though the work of the observatory refers chiefly to meteorology and terrestrial magnetism, a very useful part of it belongs to astronomical physics, for photographs of the sun are taken every day, when the weather permits. During 1892, 303 solar negatives and 285 prints were forwarded to the Solar Physics Committee for reduction. Records were obtained of well-marked magnetic disturbances on the following dates:—January 4-5, February 13-15 (this was the disturbance which accompanied the great sun-spot of February 1892), March 6-7, March 12-13, April 25-27, May 18-20, June 27-29, July 12-14, July 16-17, August 12-13, September 13, and December 5-6.

The Royal Meteorological Society and the Sanitary Institute have arranged a course of lectures on meteorology in relation to hygiene, to be given in the Parkes Museum on Mondays and Thursdays, from April 23 to May 10. Mr. G. J. Symons, F.R.S., will begin the course with a lecture on "Instruments and Observations and their Representation." He will be followed by Dr. H. R. Mill on the "Temperature of Air, Soil, and Water." Mr. R. H. Scott, F.R.S., will lecture on "Barometric Conditions and Air Movements"; Mr. W. Marriott on "Moisture, its Determination and Measurement"; Dr. C. Theodore Williams on "Climate in Relation to Health, and Geographical Distribution of Disease"; and Mr. F. Gaster on "Fog, Clouds, and Sunshine."

We have received from Messrs. O. Newmann and Co. a copy of a small book, devised and arranged after the directions of Dr. H. Zwick, on "Optical Experiments." In it are described a series of 150 experiments illustrating the laws of the propagation, reflection, and refraction of light. To make this course more useful to the class of student for which it is specially intended, namely beginners, the apparatus chosen is of a simple kind. The light source adopted throughout is that of a candle, and the experiments are selected accordingly. All the instruments referred to in the text are stated to be perfectly trustworthy, and the experiments are arranged for class-work so that many scholars may view them at the same time. For those wishing to occupy themselves with the more simple physical experiments, the book will be a useful guide. The descriptions of the experiments would perhaps have been improved if some of the technical terms employed had been more fully defined; for instance, in the first experiment the beginner is introduced to the words "rectilineal transmission," "translucent," &c. In the preface, however, Dr. Zwick refers the reader, concerning the headings, to any good text-book of natural philosophy, thus restricting himself solely to the description of the experiments. Numerous diagrams accompany the text.

At the Institution of Civil Engineers, on April 3, Mr. C. Hunt gave some interesting particulars with regard to the manufacture of gas. It has been generally assumed that the deficient yield of tar which usually accompanied the use of a high carbonising temperature is fully made up by increased production of gas. In Mr. Hunt's experience, however, the highest production of gas has been accompanied by the largest yield, both of tar and ammoniated liquor. Experiments have shown that there is a falling off of illuminating value when very high yields of gas are obtained. While the best general results may be obtained from carbonising at a fairly high temperature, it is essential that the gaseous products should be enabled to pass freely away and without encountering in the ascension-pipe any absorbent of hydrocarbons such as thick tar. Mr. Hunt has also tested the lime and air process for eliminating sulphur compounds from gas. Daily tests were made of the amount of oxygen in the gas from certain gas-works, and it was almost invariably found that when the oxygen went up the sulphur compounds followed. From this experience it was concluded (1) that oxygen, so far from assisting in the removal of sulphur compounds, was actually prejudicial, at all events, when present in any appreciable quantity; (2) that it was of use mainly for oxidation of the sulphuretted hydrogen by which economy of lime was effected, and the spent lime, being chiefly in the form of carbonate, with a large percentage of free sulphur, was rendered practically inodorous; (3) that the quantity of oxygen, either pure or as atmospheric air, which might be safely employed, having regard to reduction of sulphur compounds, varied with the CO_2 present, *i.e.* the less CO_2 the more oxygen. It further appeared that unless air could be almost completely excluded, the lime and air process was less suitable for the removal of sulphur compounds than one in which each impurity was separately attacked.

The final results of an elaborate investigation of the atomic weight of barium are communicated by Prof. Richards, of Harvard, to the current issue of the *Zeitschrift für Anorganische Chemie*. The care which has been bestowed upon the perfection of the analytical processes involved, and upon the preparation of absolutely pure materials, together with the really remarkable agreement between the large number of individual values obtained, will doubtless cause this stœchiometrical contribution of the Harvard laboratory to take high rank among the more exact atomic weight determinations. A short time ago, Prof. Richards gave an account in the same publication of a series of determinations based upon the analysis of barium bromide, from which the value 137·43 for the atomic weight of barium was derived. This number is considerably higher than the usually accepted value, 136·8, derived from the determinations of former observers. In order to confirm his work, Prof. Richards has since carried out a similar investigation of the chloride of barium, an undertaking much more complicated than that of the bromide, on account of the slight solubility of silver chloride in water. Eleven series of experiments, including altogether forty-nine individual atomic weight estimations, have now been carried out, having for their object the determination of the ratio of barium chloride to silver chloride, of barium chloride to metallic silver, of barium bromide to silver bromide, and of barium bromide to silver. The atomic weight finally arrived at, if oxygen is valued at 16, is 137·43; the actual number obtained by use of the chloride was 137·439, and that derived from the bromide 137·430. Moreover, the highest and lowest individual values obtained among the whole fifty separate estimations were 137·42 and 137·45, an amount of accordance which affords evidence of the extreme precautions taken, and of the high degree of accuracy attained. If the Stas value for oxygen, 15·96, is assumed, the atomic weight of barium is 137·10, and if the new value, 15·88, is taken as comparative standard, that of barium becomes 136·41. It is interesting that the experiments with barium chloride afford a means of independently ascertaining the atomic weight of chlorine, and the number thus obtained is 35·457, identical with the value ascribed to it by Stas.

The additions to the Zoological Society's Gardens during the past week include a Brown Capuchin (*Cebus fatuellus*) from Guiana, presented by Mrs. Walter Palmer; two Leopards (*Felis pardus*, ♂ ♀) from south-east Africa, presented by Mr. J. Gardiner Muir; a Vulpine Phalanger (*Phalangista vulpina*, ♂) from Australia, presented by Mr. Raymond W. Cooper; a Crab-eating Opossum (*Didelphys cancrivora*, ♂) from St. Vincent, presented by Mr. G. Stephen; a Tawny Owl (*Syrnium aluco*) British, presented by Mr. G. L. Hunt; a Greek Tortoise (*Testudo græca*) European, presented by Miss Leigh; a —— Elaps (*Elaps*, sp. inc.), a Pointed Tree Snake (*Dryiophis acuminata*), a Clouded Snake (*Leptognathus nebulosis*) from Trinidad, W.I., presented by Mr. R. R. Mole; a Tarantula Spider (*Mygale*, sp. inc.) from Trinidad, W.I., presented by the Rev. S. D. Wright; a Malabar Parrakeet (*Palæornis columboides*) from India, deposited; four Bahama ducks (*Dafila bahamensis*, ♂ ♂, ♀ ♀) from South America, two Mandarin Ducks (*Æx galericulata*, ♀ ♀) from China, a Spotted-billed Duck (*Anas pœcilorhyncha*, ♀) from India, a Ruddy Sheldrake (*Tadorna casarca*, ♀) European, four White-backed Pigeons (*Columba leuconota*) from India, purchased; a Burrhel Wild Sheep (*Ovis burrhel*, ♂) from the Himalayas, received in exchange.

OUR ASTRONOMICAL COLUMN.

Denning's Comet.—*Astronomische Nachrichten* (No. 3222) contains the following elements, computed by M. Schulhof, for the comet discovered by Mr. Denning on March 26:—

$$T = 1894 \text{ February } 13{\cdot}20392 \text{ Paris Mean Time.}$$

$$\left.\begin{array}{rl} x = & 132^{\circ}\ 14'\ 31''{\cdot}6 \\ ☊ = & 75\ \ 51\ \ 46{\cdot}1 \\ i = & 6\ \ 31\ \ 14{\cdot}0 \end{array}\right\} \text{Mean Eq. } 1894.$$

$$\log q = 0{\cdot}084720$$

These elements resemble those of comets seen in 1231 and 1746.

Ephemeris for Berlin Midnight.

1894.	R.A. h.	m.	s.	Decl. °	′
April 12	10	47	37	+23	14·6
13		50	7	22	45·5
14		52	33	22	16·9
15		54	57	21	48·6
16		57	18	21	20·7
17	10	59	36	20	53·3
18	11	1	51	20	26·3

The Natal Observatory.—The superintendent of the Natal Observatory has issued his report for the fiscal year 1892–93. The principal series of observations made during this period was the comparison of the declinations deduced from observations made at the observatories in the northern and southern hemispheres, by a comparison by Talcott's method, of the zenith distances of northern stars and southern circumpolar stars. The opposition of Mars in 1892 threw a deal of extra work upon the observatory. Thirty-eight sets of meridian observations of the planet were obtained, and sixty-two sets of observations taken on opposite sides of the meridian towards the eastern or western horizon. The whole series of these observations have been completely reduced and tabulated, ready for the final discussion for obtaining the value of the solar parallax and distance of the sun as soon as the meridian observations of the planet, made in the northern hemisphere, have been received. The observations made at the Cape observatory supplement those obtained at Natal, and the two sets combine to form a complete set extending over the whole period of opposition. This year will bring another favourable opportunity for determining the solar distance from observations for the opposition of Mars, and the observatory will be far better equipped for observing this opposition than was the case during the last one, and if the weather be favourable a very satisfactory series of observations should be obtained during this, the last, opportunity until the year 1911.

A New Comet.—The following announcement has been sent out by the Astronomer Royal:—"Bright comet Holmes, April 9. Right Ascension, 17h. 58m.; North Declination, 71° 30′."